

Collaborative Modeling for Decision Making



Objectives

- ◆ Introduction
 - Why we need collaborative planning?
 - What is collaborative planning?
- ◆ Trust Through Model Certification
- ◆ Flexibility through Scripting
- ◆ Fidelity
- ◆ Process (HEC-WAT)
- ◆ Conclusion and Status



Introduction – Why collaborative planning?

- ◆ Demands for water resources continues to grow leading to increasing competition for remaining resources.
 - Sacramento/San Joaquin Delta Water
 - Colorado River Compact – Great Basin States
 - ACT – ACF (Water supply and drought in the SE)
- ◆ Increasing competition leads to disputes as multiple stakeholders participate in the study process.



Introduction – What is collaborative planning?

- ◆ CADRe
- ◆ Decision Support Systems
- ◆ Integrated Water Resources Management
- ◆ Watershed or Systems Studies
- ◆ Shared Vision Planning (SVP) is a collaborative approach to formulating water management solutions that combines three disparate practices: 1) traditional water resources planning, 2) structured public participation and 3) collaborative computer modeling.



Collaborative Computer Modeling

- ◆ Shared Vision Planning creates user-friendly and understandable computer models that are relevant to stakeholder interests, transparent, and adaptable to changing conditions.
- ◆ We have corporately available software that can be used in the Shared Vision Planning process. They build trust.



Trust Through Model Certification

- ◆ EC 1105-2-407 – Planning Models Improvement Program: Model Certification
- ◆ Model Certification is a corporate approval that the software is theoretically and computationally sound, compliant with Corps policy and based on reasonable assumptions regarding availability of data.
- ◆ Use of certified software for all planning activities is mandatory.
- ◆ ITR of software application still needed.



Engineering and Construction Bulletin No. 2007-6, issued: 10 April 2007

- ◆ Subject: Model Certification for Engineering Software in Planning Studies
- ◆ Until engineering has completed the certification process, we proceed as we have in the past.
 - Responsible use of well known products
 - ITR
- ◆ Seventeen lists of HH&C CoP software available to the field.



Flexibility Through Scripting

- ◆ Complaint of older software was that it was inflexible.
- ◆ Flexibility has been added through GUI's, GIS capabilities and scripting.
- ◆ In general, with scripting, the user now has the ability to perform tasks that the generic piece of software is not prepared to do.
- ◆ For example: salinity routing in ResSim, water supply in ResSim, creating plots and tables, compare results from two separate pieces of software.

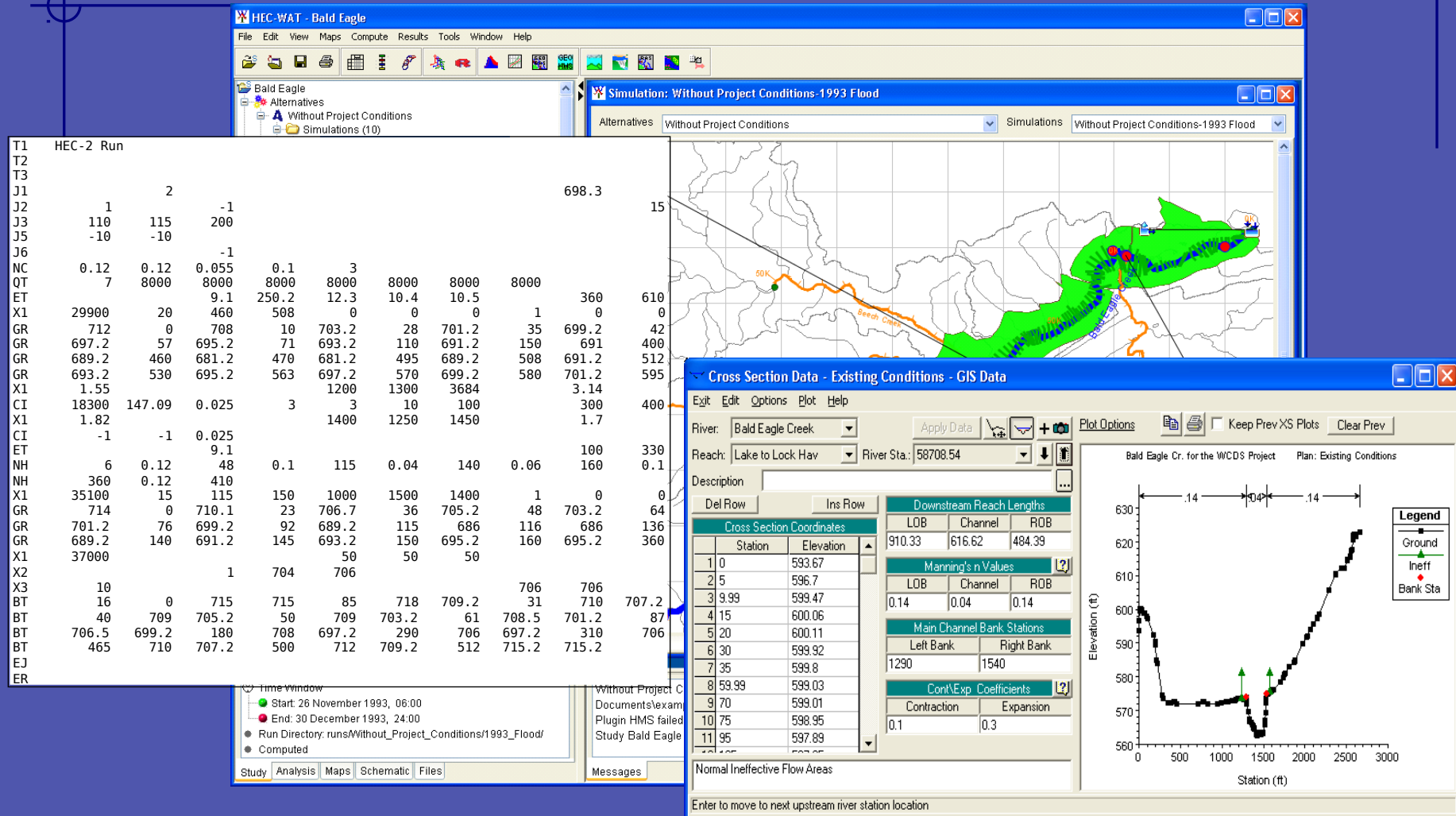


Fidelity – more detailed modeling

- ◆ Planning studies require modeling at many levels of detail.
- ◆ HEC-NexGen Effort
- ◆ Regime Prescription Tool (HEC-RPT vs HEC-ResSim)
- ◆ HEC-RAS working in concert with ADH (Adaptive Hydraulics Modeling Systems)
- ◆ As models become increasingly sophisticated working within the same environment will enhance the collaborative process.



Data Entry – Old vs. New



Process - Watershed Analysis Tool (HEC-WAT)

Interface that streamlines and integrates the analytical process of Water Resource Studies using the tools commonly applied by multi-disciplinary teams. Includes: hydrologic, hydraulic, economic, environmental, and social impact assessments

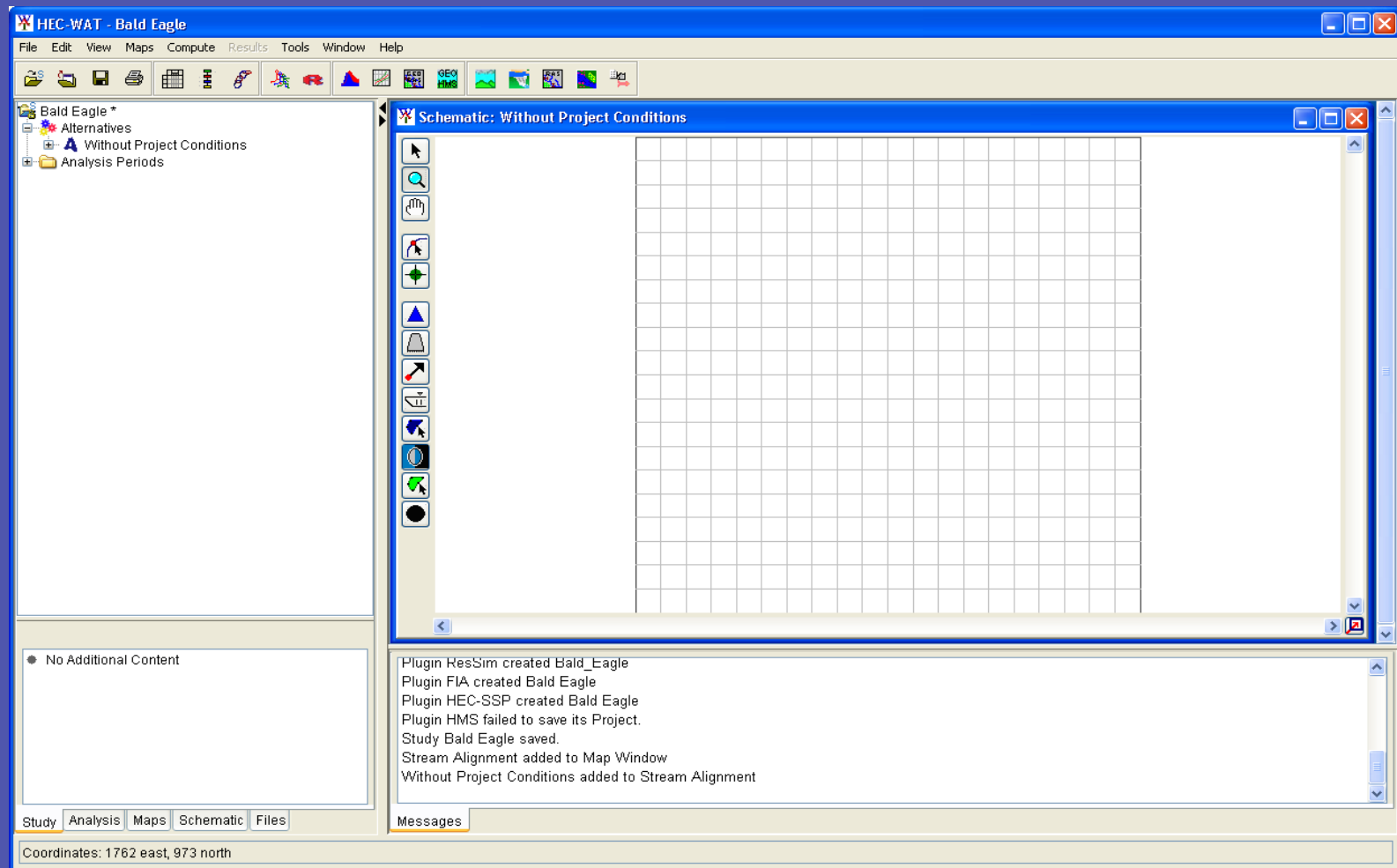


Collaboration with HEC-WAT

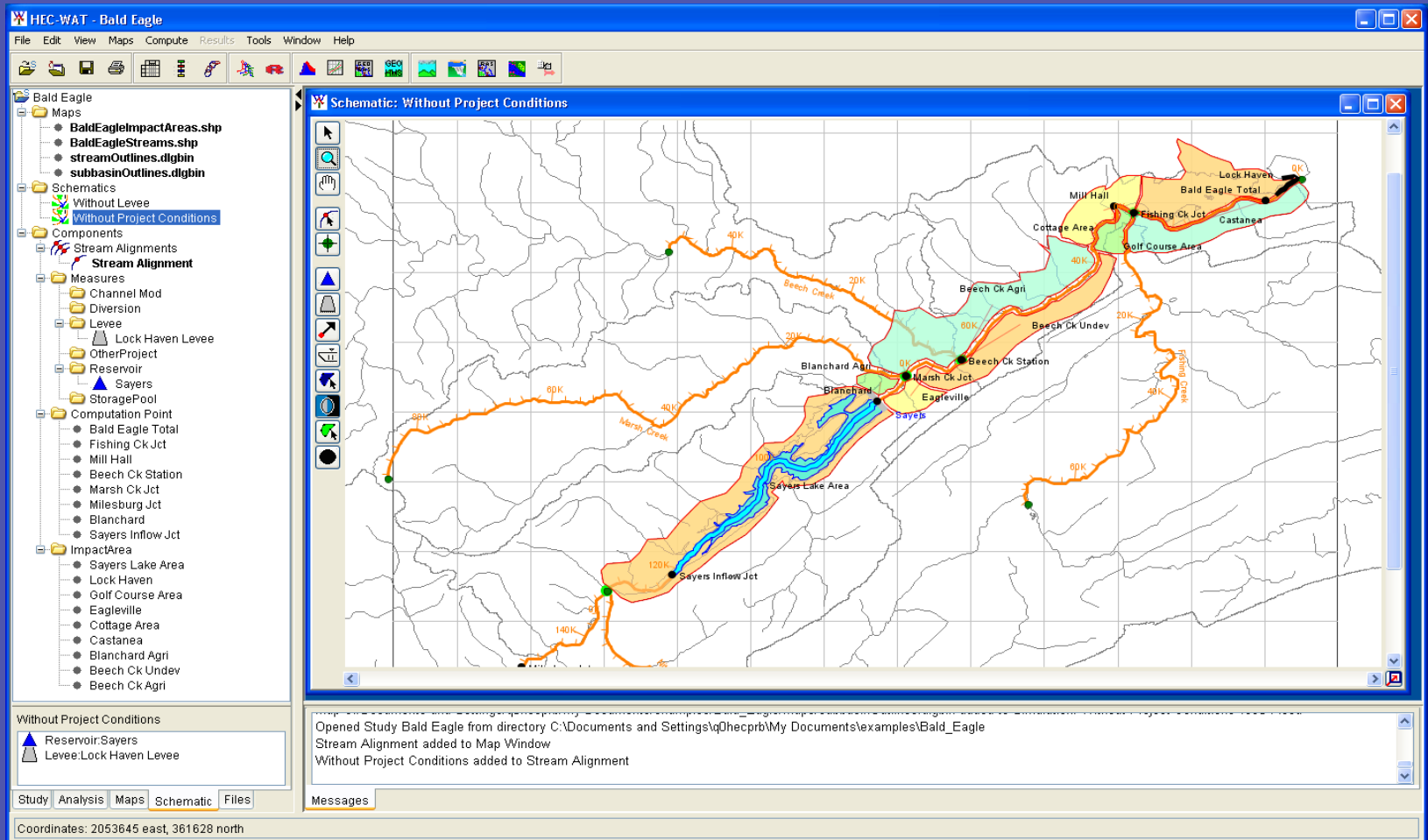
- ◆ Using one interface the Project Delivery Team will:
 - Define the study area
 - Define alternatives to be evaluated
 - Identify models to be created
 - Provide access to create, edit, and link models
 - Store and share data, models, and modeling results
 - Perform alternative analyses
 - Display results
 - Track project status and perform resource management



HEC-WAT Main Screen



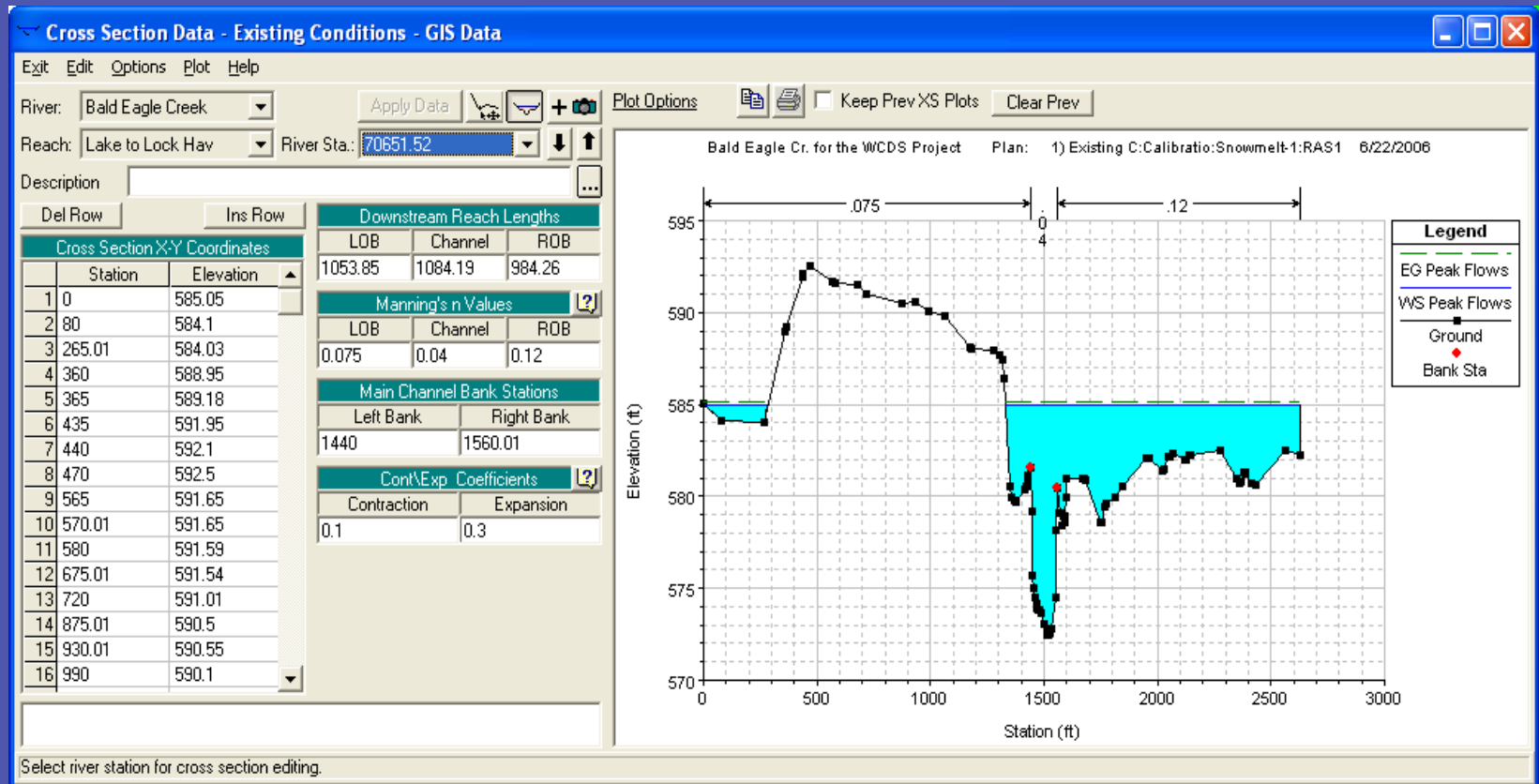
HEC-WAT Schematic



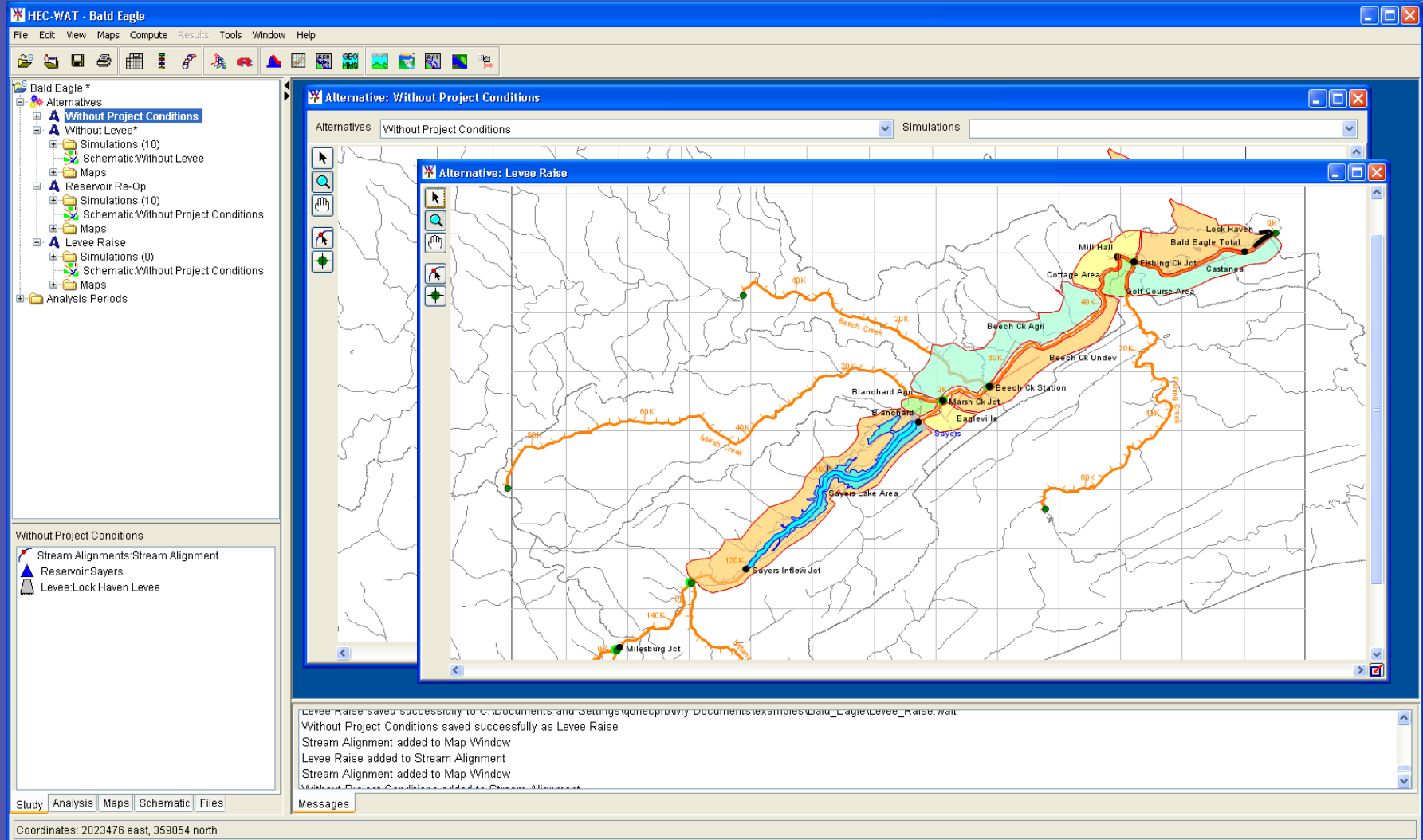
Flood Damage

USACE
CEIWR-HEC

Work with Models Directly from WAT (RAS)



HEC-WAT Alternative Formulation



Alternative and Simulation Manager

Alternative and Simulation Manager

File Edit View Help

Analysis Periods

Alternatives	1993 Flood		2004 Flood		Frequency Based Events										Period of Record	
						2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	250-yr	500-yr		Historic	Global
Without Project Conditions	HMS	Run 1	HMS	Run 2	HMS	2 Year	5 year	10 Year	25 Year	50 Year	100 Year	250 Year	500 Year	HMS	Run 1	Run 2
	ResSim	StdOpNoDiv	ResSim	StdOpNoDiv	ResSim	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNoDiv	StdOpNoDiv	StdOpNoDiv	ResSim	StdOpNoDiv	StdOpNoDiv
	RAS	Existing Conditions	RAS	Existing Conditions	RAS	Existing...	Existing...	Existing...	Existing...	Existing...	Existing...	Existing...	Existing...	RAS	Existing Conditions	Existing Conditions
	FIA	Without Project Conditions	FIA	Without Project Conditions	FIA	Without...	Without...	Without...	Without...	Without...	Without Pr...	Without Pr...	Without Pr...	FIA	Without Project Conditions	Without Project Conditions
Without Levee	HMS	WOL Run	HMS	WOL Run2	HMS	2 Year	5 year	10 Year	25 Year	50 Year	100 Year	250 Year	500 Year	HMS	WOL Run	WOL Run2
	ResSim	StdOpNoDiv	ResSim	StdOpNoDiv	ResSim	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNo...	StdOpNoDiv	StdOpNoDiv	StdOpNoDiv	ResSim	StdOpNoDiv	StdOpNoDiv
	RAS	Without Project Conditions	RAS	Without Project Conditions	RAS	Without...	Without...	Without...	Without...	Without...	Without Pr...	Without Pr...	Without Pr...	RAS	Without Project Conditions	Without Project Conditions
	FIA	Without Levee	FIA	Without Levee	FIA	Without...	Without...	Without L...	Without L...	Without L...	Without Le...	Without Le...	Without Le...	FIA	Without Levee	Without Levee
Reservoir Re-Op	HMS	Run 1	HMS	Run 2	HMS	2 Year	5 year	10 Year	25 Year	50 Year	100 Year	250 Year	500 Year	HMS	Run 1	Run 2
	ResSim	ReOpNoDiv	ResSim	ReOpNoDiv	ResSim	ReOpNo...	ReOpNo...	ReOpNo...	ReOpNo...	ReOpNo...	ReOpNoDiv	ReOpNoDiv	ReOpNoDiv	ResSim	ReOpNoDiv	ReOpNoDiv
	RAS	Existing Conditions	RAS	Existing Conditions	RAS	Unstea...	Unstea...	Unstead...	Unstead...	Unstead...	Unsteady...	Unsteady...	Unsteady...	RAS	Existing Conditions	Existing Conditions
	FIA	Without Project Conditions	FIA	Without Project Conditions	FIA	Without...	Without...	Without...	Without...	Without...	Without Pr...	Without Pr...	Without Pr...	FIA	Without Project Conditions	Without Project Conditions

OK Cancel Apply



Alternative Comparison Manager

Alternative Comparison Manager

Alternatives	Analysis Periods									
	1993 Flood	2004 Flood	Frequency Based Events							
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	250-yr	500-yr
Without Project Conditions	☒ P	☐	☐	☐	☐	☐	☐	☐	☐	☐
Without Levee	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Reservoir Re-Op	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Color Legend
 Compute Error
 Computed
 Never Computed
 Out-of-Date
 Not Computable

Create/Edit Analysis Groups (optional):

The image displays five screenshots from the HEC-WAT Bald Eagle software interface, illustrating various simulation and reporting features.

Top Left: Compare Alternatives Report - Bald Eagle

Base Alternative: Without Project Conditions View By: Impact Area

Comparison Alternatives: Without Levee

Urban Structures Population Agriculture

Bald Eagle Urban Damage Summary Urban Price Index: 1.0 Urban Price Index Date: 1998

Impact Area Name	Damage Category	Flood Damage Base: Without Project Conditions (\$1000)	Flood Damage Without Levee (\$1000)	Flood Damage Reduced Base - Without Levee (\$1000)
Golf Course Area	Developed Open ...	0	0	0
	High Intensity Co...	0	0	0
	High Intensity Re...	0	0	0
	Low Intensity Res...	0	0	0
	Undeveloped Ope...	0	0	0
	Sub-Total	0	0	0
Lock Haven	Total Damage	2330	0	2330
	Sub-Total	2330	0	2330
Sayers Lake Area	Developed Open ...	0	0	0
	High Intensity Co...	0	0	0
	High Intensity Re...	0	0	0
	Low Intensity Res...	0	0	0
	Undeveloped Ope...	0	0	0
	Sub-Total	0	0	0
	Total	2330	0	2330

Print ... Save To File ... Close

Top Right: Simulations

Without Project Conditions-1993 Flood

Bald Eagle Cr. for the WCDS Project Plan: 1) Without Pr-1993 Flood RAS 5/9/2007 2) Reservoir: 1993 Flood RAS 5/9/2007

Bottom Left: Sayers, 11:20AM

Alternative: Without Project Conditions Analysis Period: 1993 Flood Models Run 1 StdOpNoDiv Existing Conditions Without Project Conditions Time Window Start: 26 November 1993, 06:00 End: 30 December 1993, 24:00 Run Directory: runs/Without_Project_Cond Out-of-Date

Study Analysis Maps Schematic Files

Coordinates: 2002140 east, 320754 north

Bottom Right: Cross

Elevation (ft) Station (ft)

Emphasis/BaldEagleImpactAreas.shp added to Simulation: Reservoir Re-Op-1993 Flood e/maps/BaldEagleStreams.shp added to Simulation: Reservoir Re-Op-1993 Flood e/maps/streamOutlines.dlgbin added to Simulation: Reservoir Re-Op-1993 Flood e/maps/subbasinOutlines.dlgbin added to Simulation: Reservoir Re-Op-1993 Flood WAT_Studies_May2007/Bald_Eagle imports/WAT_Studies_May2007/Bald_Eagle/Frequency_Based_Events.w



Output Reports and Graphics

- ◆ Flow frequency curves
- ◆ Statistical plots
- ◆ Flow/stage hydrographs
- ◆ Inflow, storage, stage, outflow from reservoirs
- ◆ Cross-section plots
- ◆ Flood inundation boundary maps/water surface profiles
- ◆ Plan comparisons
- ◆ Event damage



Conclusion and Status

- ◆ Collaborative planning is the way of the future.
- ◆ Existing, tested, corporate software can be used for the collaborative process.
- ◆ The WAT is a program that integrates models and provides coordination and analysis for water resource studies.
- ◆ Integrates major HEC programs, such as SSP, HMS, RAS, ResSim, FIA, DSSVue, FDA, EFM etc.
- ◆ Visualization tools to create and edit models and compare alternatives creates a transparent, open, collaborative and trusting modeling environment
- ◆ Testing with beta version
 - Documentation, Beta release and distribution – March 2008
 - We are looking for Beta testers. Are you interested?
 - Version 1.0, due September 2008?

